

**Appln. No.: 10/019,919**  
**Amendment Dated: September 29, 2003**  
**Reply to Office action of 05/29/2003**

**REMARKS**

Claims 12-32 remain in the application. Claims 12-22 are claims 11-21 which were previously submitted in the Preliminary Amendment, and have been renumbered by the Examiner as applicant mistakenly numbered the first new claim as claim 11 when a claim 11 already appeared in the application as originally filed. Claims 23-32 are now dependent claims directed to specific embodiments.

A substitute specification (excluding the claims) is submitted as requested by the Examiner. It is further noted that the substitute specification does not contain any new matter.

The objection to the ABSTRACT has been overcome by canceling the offending last sentence.

The objections to claims 12 and 18 have been overcome by amendment as suggested by the Examiner.

The objection to the drawings has been overcome by adding the reference numeral "64" to the paragraph appearing on page 11, beginning on line 3.

The rejection of claims 12 and 13 as being indefinite has been overcome by amendment as suggested by the Examiner.

A terminal disclaimer is submitted herewith to overcome the obviousness-type double patenting rejection over co-pending application serial number 09/995,935. A check is included herewith for the required fee under 37 CFR 1.20(d) of \$ 110.00.

The claims have been amended to overcome the rejection over Strain et al. '704 and/or Lupertz '209.

Overall it should be noted that this invention is directed to an automotive spot type disc brake, and to the mounting of disc control springs upon the discs with the springs being specifically adapted to be mounted on the disc by structures of the springs adapted to engage and grip the disc such that the springs move with the disc during brake actuation. The springs provide control of the disc position and in particular prevent the disc tilting. The conventional approach for such sliding disc brakes has been to mount the disc control springs upon the hub with mounting upon the disc generally not seen as desirable at least from a thermal point of view.

United States Patent 3,233,704 (Strain), relates to an annular brake arrangement comprising a series of annular rings 17 and annular friction material discs 23 (column 2 line 25/26). This brake is furthermore specifically adapted and directed to braking an electric motor (column 2 line 11). This type of brake, as would be appreciated by those skilled in the art, is completely different to the automotive spot type brake arrangement with which the invention is concerned, in which there is a disc and friction material pads which engage the disc at a spot or over only a portion of the circumference of the disc.

The springs 32 in Strain also does not act to center the disc on the mounting hub nor prevent tilting of the disc as in the case of the present invention. In Strain, the springs are specifically described as "inhibiting rattle" (column 3 line 37). As noted in the present application anti rattle springs and anti tilt / positioning springs differ significantly. The springs in the present invention are evenly spaced (see original page 3, line 19 for "equi-spaced" around the circumference of the disc, and are symmetrically mounted on the disc teeth to provide such an important centering function and anti tilt function. In contrast,

the springs 32 in Strain are unevenly distributed about the disc, are mounted on one side only and are asymmetrically located upon the discs.

Furthermore, whilst Strain does show a spring 32 mounted upon a disc 23 with this spring gripping and attaching to the disc and sliding with the disc, the springs 32 are not mounted around or operatively associated with the drive keys of the disc, as in some of the detailed embodiments of the present invention. Indeed in Strain there are no drive teeth, with Strain adopting a completely different approach involving a square hub and aperture within the disc. Mounting the springs/resilient means by gripping of disc teeth or keys provide a more secure location.

With regard to United States Patent 4,256,209 (Lupertz), this simply shows a resilient band disposed between interconnecting teeth of a sliding disc with a hub. In this arrangement the resilient means (spring) is not specifically attached or adapted to engage the disc nor does the resilient means (spring) slide with the disc in operation. This band is to transmit torque (column 1 line 64 to 66) rather than to prevent tilting of disc and provide a bias force to maintain the orientation of the disc. Furthermore, and contrary to the Examiner's assertion in Lupertz the resilient band does not straddle the drive keys in the manner of the present invention, with the resilient means in Lupertz abutting against the apex of the ridges, rather than the resilient means straddling and being mounted over and around the teeth.

Amendments to the claims have been made to further highlight these distinctions over the prior art. It is specified that the resilient devices are evenly spaced around the circumference to center the disc, and/or are symmetrically disposed on the disc. The

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claims are amended to specify that the disc is interconnected with the hub by means of drive keys. Furthermore, the claims recite the resilient device mounted upon and/or associated with the disc keys, as this is the preferred embodiment.

Additional dependent claims are added to cover the various specific spring embodiments described in this application. In particular claims have been added to specify that:

**Claim 23**      The resilient means comprises a wire format spring Figures 2-5, 10-17, and 21 to 27.

**Claim 24**      The resilient means is constituted by a wire spring of a generally endless loop format having two inwardly-directed portions defining a waist adapted to fit around a drive key of the disc, and with lateral side portions of the spring acting upon outwardly-facing surface of the hub, and the waist portions of the spring bearing on the disc. (Figures 2 to 5)

**Claim 25**      The resilient means having upturned ends defining smooth-curved contact portions which abut against the outwardly-facing surfaces of the hub (Figure 12; Figure 16)

**Claim 26-27**   The resilient means comprises a wire format spring format comprising a portion arranged to extend between opposite axial

sides of the disc, and having an end portion at one side of the disc which engages the disc and a hairpin-form spring format at the other side of the disc for engagement with the hub. The portion extending between opposite sides of the disc abuts against and engages the disc whilst the hairpin portion has a distal curved profiled portion to bear against the disc. (Figures 10 to 13).

**Claim 28** The resilient means comprises a loop format wire spring of a bowed side elevation profile when installed on the disc with the ends of the spring engaged between mounting formations defined in the inner edge of the disc such that a central portion of the spring abuts against the outer peripheral surface of the hub. (Figure 21 to 23).

**Claims 29-30** The resilient means comprises a wire spring comprising four double loops arranged in an X format in side elevation and which define an opening there between within which a disc tooth is engaged to attach the spring to the disc with the spring straddling the tooth. A pair of the loops comprising upper arms of the X format spring abut against the inner periphery of the disc with a lower pair of loops abutting against the outer periphery of the hub. (Figure 24 to 27)

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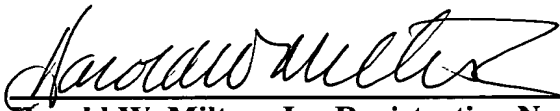
**Claim 31-32** The resilient means comprise a strip with a number of apertures defined therein corresponding to the disc teeth. The strip is installed about the inner periphery of the disc with the apertures fitting over and straddling the disc teeth with the strip extending in a generally chordal direction relative to the disc inner periphery.  
(Figure 28 to 30)

Accordingly, it is respectfully submitted that the Application and claims, as amended, now presented are in condition for allowance, which allowance is respectfully solicited. The Commissioner is authorized to charge our Deposit Account No. 08-2789 for any additional fees and or credit the account for any overpayment.

Respectfully submitted

**HOWARD & HOWARD ATTORNEYS, P.C.**

9/29/03  
Date

  
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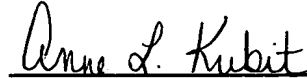
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**CERTIFICATE OF MAILING**

I hereby certify that this **Amendment** for U.S. Serial No.: 10/019,919 filed April 19, 2002 is being deposited with the United States Postal Service as First Class Mail, postage prepaid, in an envelope addressed to the Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450 on **September 29, 2003**.

  
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Anne L. Kubit

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